

SECTION 4 Computer Networks

Recommended Prior Knowledge

Students will require basic experience of using a desktop computer. They should understand hardware and software as well as different forms of input, output and storage devices. They should have used the Internet for research.

Context

This section should be the fourth studied by the students. It builds on the knowledge obtained from studying all the previous sections.

Outline

This section describes the components of typical LAN and WAN networks.

section	Learning Outcomes	Suggested Teaching Activities	Online Resources	Other resources
4a	Describe a modem and its purpose.	If possible, disconnect a modem from the computer and show what happens when you try to connect to the Internet	http://www.jegsworks.com/Lessons/lesson7/lesson7-3.htm http://www.bbc.co.uk/schools/gcsebitesize/ict/datacomm/0internetrev3.shtml	(Walmsley, et. al., 2004, Chapter 4) (Leadbetter, & Wainwright, 2004, 1.1)
4b	State the difference between analogue data and digital data.	<ul style="list-style-type: none">• Demonstrate analogue devices such as, clocks and mercury thermometers, explaining how variables are represented by an analogous quantity (time is represented by the angle of the hands, temperature is represented by the height of a mercury column etc).• Explain how data can be represented digitally in 1s and 0s.	http://www.jegsworks.com/Lessons/lesson7/lesson7-3.htm http://www.bbc.co.uk/schools/gcsebitesize/ict/measurecontrol/0computercontrolrev3.shtml http://www.bbc.co.uk/schools/gcsebitesize/ict/measurecontrol/0computercontrolrev6.shtml	(Walmsley, et. al., 2004, Chpts 4 & 14)
4c	Describe the need for conversion between analogue and digital data.	<ul style="list-style-type: none">• Explain how computers work with data in a digital form whereas external devices such as telephone lines and sensors transmit data in an analogue form.• Explain the need for ADCs to convert the data in a physical form to a digital form.	http://www.jegsworks.com/Lessons/lesson7/lesson7-3.htm	(Walmsley, et. al., 2004, Chpts 4 & 14)

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4d	Identify the advantages and disadvantages of using common network environments such as the Internet.	A class discussion is usually a good starter. Allow students to give examples of good experiences and difficulties they have had.	http://www.bbc.co.uk/schools/gcsebitesize/ict/datacomm/0internetrev2.shtml	(Leadbetter, & Wainwright, 2004, 2.2) (Walmsley, et. al., 2004, Chpts 6, 8 & 10)
4e	Describe what is meant by the terms user id and password, stating their purpose and use.	Use your own network as an example.		(Walmsley, et. al., 2004, Chpts 4, 6 & 8)
4f	Identify a variety of methods of communication such as: <ul style="list-style-type: none"> • fax, • e-mail, • bulletin boards, • tele/video conferencing. 	Demonstrate, if possible, how each one is used.		(Walmsley, et. al., 2004, Chapter 4) (Leadbetter, & Wainwright, 2004, 11.2)
4g	Define the terms Local Area Network (LAN) and Wide Area Network (WAN).	<ul style="list-style-type: none"> • A LAN is normally situated in a single building. • A WAN covers a much larger area. • WANS are very common and are not necessarily Internet based. 	http://www.jegsworks.com/Lessons/lesson7/lesson7-5.htm http://www.bbc.co.uk/schools/gcsebitesize/ict/datacomm/2networksrev2.shtml	(Walmsley, et. al., 2004, Chapter 10) (Leadbetter, & Wainwright, 2004, 14)
4h	Describe the difference between LANs and WANs, identifying their main characteristics.	Discuss how LANs become a WAN when some form of communication device, usually a modem, is used to connect them together	http://www.jegsworks.com/Lessons/lesson7/lesson7-5.htm http://www.bbc.co.uk/schools/gcsebitesize/ict/datacomm/2networksrev2.shtml	(Walmsley, et. al., 2004, Chapter 10) (Leadbetter, & Wainwright, 2004, 14)
4i	Identify the different network topologies, including: <ul style="list-style-type: none"> • star, • ring, • bus. 	Sketch a star, a ring and a line and then draw workstations at appropriate intervals, indicating the position of the server.	http://www.jegsworks.com/Lessons/lesson7/lesson7-6.htm	(Walmsley, et. al., 2004, Chapter 10) (Leadbetter, & Wainwright, 2004, 14)

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4j	Describe the characteristics and purpose of common network environments, such as intranets and the Internet.	<ul style="list-style-type: none"> • Explain how intranets are usually internally used within a company or organisation and not intended for access by people outside this. • The Internet is worldwide and intended to be accessed by anybody. 		(Walmsley, et. al., 2004, Chpts 10 & 15) (Leadbetter, & Wainwright, 2004, 2.2 & 2.3)
4k	Discuss the problems of confidentiality of data, including problems surrounding common network environments.	Discuss the need to secure data and protect it from unlawful use. The use of usernames and passwords should be taught as separate items.	http://www.bbc.co.uk/schools/gcsebitesize/ict/databases/6datasecurityrev1.shtml http://www.bbc.co.uk/schools/gcsebitesize/ict/legal/0dataprotectionactrev3.shtml	(Walmsley, et. al., 2004, Chapter 8) (Leadbetter, & Wainwright, 2004, 2.5 & 2.6)
4l	Identify the need for encryption and authentication techniques when using common network environments such as the Internet.	Discuss how data has to be encrypted for transmission and storage.	http://www.bbc.co.uk/schools/gcsebitesize/ict/databases/6datasecurityrev3.shtml	(Walmsley, et. al., 2004, Chapter 8) (Leadbetter, & Wainwright, 2004, 2.2)